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Terrestrial Isopod Crustaceans from southern Kyushu, Southern Japan*

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南九州産陸生等脚目甲殻類

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南九州の陸産等脚目甲殻類を調査し，4新種を含む18種を確認できたので報告する。科や属レベルとしては琉球列島から紀伊半島を初めとする本州南岸に共通するものが多いが，種レベルでは九州他地域との共通性が高かった。本報告で新種として扱かったものは *Burmoniscus kagoshimaensis* (和名：カゴシマモリワラジムシ（新称)), *Burmoniscus dasystylus* (和名：ケブカモリワラジムシ（新称)), *Lucasioides nichinanensis* (和名：ニチナンハヤシワラジムシ（新称)), *Venezillo lepidus* (和名：ハヤトコシビロダンゴムシ（新称)) の4種である.これらの完模式標本は富山市科学文化センターで保管される。*Ligidium* (*Nipponoligidium*) sp., *Exalloniscus* sp., *Marinoniscus* sp. の3種は標本数が少なく，種名決定ができなったが，特徴を記載した。また *Venzillo dorsalis* (Iwamoto, 1943) については本州産の標本といくつかの変異が認められたので再記載した。なお，本研究は平成14年度科学研究費補助金（奨励研究）による研究14918012を使用して行われたものである。

キーワード：等脚目，ワラジムシ，新種，南九州，ハヤシワラジムシ，コシビロダンゴムシ，モリワラジムシ，
Key words：Isopoda, new species, Southern Kyushu, Burmoniscus, Lucasioides, Venezillo.

Hitherto, the terresrial Isopod crustacean fauna of southern Kyushu has been much igonored, I made a collecting trip to the southern Kyushu, espeically, Aya, Nichinan, Miyakonojo and Kushima of Miyazaki Prefecturre, and Cape Sata, Oo-nejime, Nejime, Ibusuki, Kaimon, Bou, Makurazaki and Makizokono of Kagoshima Prefecture (Fig. 1). Adding to more than 500 specimens collected the above-mentiond colleting trip, I could examine the specimens deposicted at the Toyama Science Museum and the specimens from Dr. Minako Terada, Mr. Kunio Nishi and other scientists.

Acknowledgement

I wish to express my sincere gratitude to Mr.Kuniso Nishi, who kindly sent to me some important samples. My thganks are due to Dr.Minako Terada of Kanda University of International Studies. This study is supported by the Grants-in-Aid for Scientific Research, Encouragement of Young Scientists No.*14918012*.

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*Contirbutions form the Toyama Science Museum, No.281

Fig 1. Map showing the main collecting sites

Order Isopoda

Family Ligiidae

Ligia exotica Roux, 1828

Ligia exotica Roux, 1828; p.13, fig.9.

Ligia exotica Roux, 1828; Nunomura, 1968, pp. 26-27, fig. 1.

Material examined: 2 ♂♂, Natsui, Kashima-shi, Kagoshima Pref. May 27, 2002, coll. Noboru Nunomura; 2♂♂4♀♀, Takamatsu, Kushima-shi, Miyazaki Pref. May 27, 2002. coll. Noboru Nunomura; 8 youngs, Oh-domari, Satacho, Kagoshima Pref. May 28, 2002, coll. Noboru Nunomura; 2 youngs, Oh-hama, Nejime-cho, Kagoshima Pref. coll. Noboru Nunomura; 2 youngs, Sewaki, Nejime-cho, Kagoshima Pref. May 27, 2002, coll. Noboru Nunomura; 1♀, Aburatsu, Nichinan, Sep. 23, 1983, coll. N. Nunomura.

Ligidium koreanum Flasarova, 1972

Ligidium koreanum Flasarova, 1972, pp. 95-102, figs. 7-23.

Ligidium koreanum Flasarova, 1972; Nunomura, 1983, pp. 38-39, fig. 8.

Material examined: 1♀, Hyuga-shi, Miyazaki Pref. Aug., 2002, coll. Kunio Nishi.

Ligidium (*Nipponoligidium*) sp. (aff. *koreanum* Flasarova)

(Fig. 2)

Descriptions: Body 2.3 times as long as wide. Color brown, with irregular patterns. Postero-lateral margin of pereonal somite 1 without a bundle of setae. Eyes relatively small, each eye with 24 ommatidia. Posterior margin of pleotelson almost rounded.

Antennula (Fig. 2B) with 2 segments; terminal segment with 3 aesthetascs at the tip. Antenna (Fig. 2C), reaching the middle area of pereonal somite 2; flagellum composed of 9 segments.

Right mandible (Fig. 2D) : pars incisiva with 2 teeth; lacinia mobilis 5-toothed; 3 plumose setae; processus molaris wide. Maxillula (Fig. 2E): endopod with 3 longer and a shorter plumose setae; exopod with 4 teeth including a thin plumose one. Maxilla (Fig. 2F): wide, with 2 stout spurs on postero-lateral area. Hindo-lateral area of pereonal somite 1 (Fig. 2G) without a bundle of setae. Pereopod 1 (Fig. 2H): basis 2.8 times as long as wide, with 3 setae on inner margin; ischium 1/2 as long as basis, with 2 setae on inner margin and a seta at outer distal area; merus 3/5 as long as basis, with 2 longer and 2 shorter setae on inner margin and 2 setae at outer distal area; carpus 2/3 as long as merus, with 6-7 setae including a long one on inner margin and 3-4 setae at outer distal angle; propodus almost as long as carpus, with 3 setae on inner margin.

Pereopod 3 (Fig. 2I): basis 3.3 times as long as wide, with 5-6 setae on inner margin and 4 setae on outer margin;

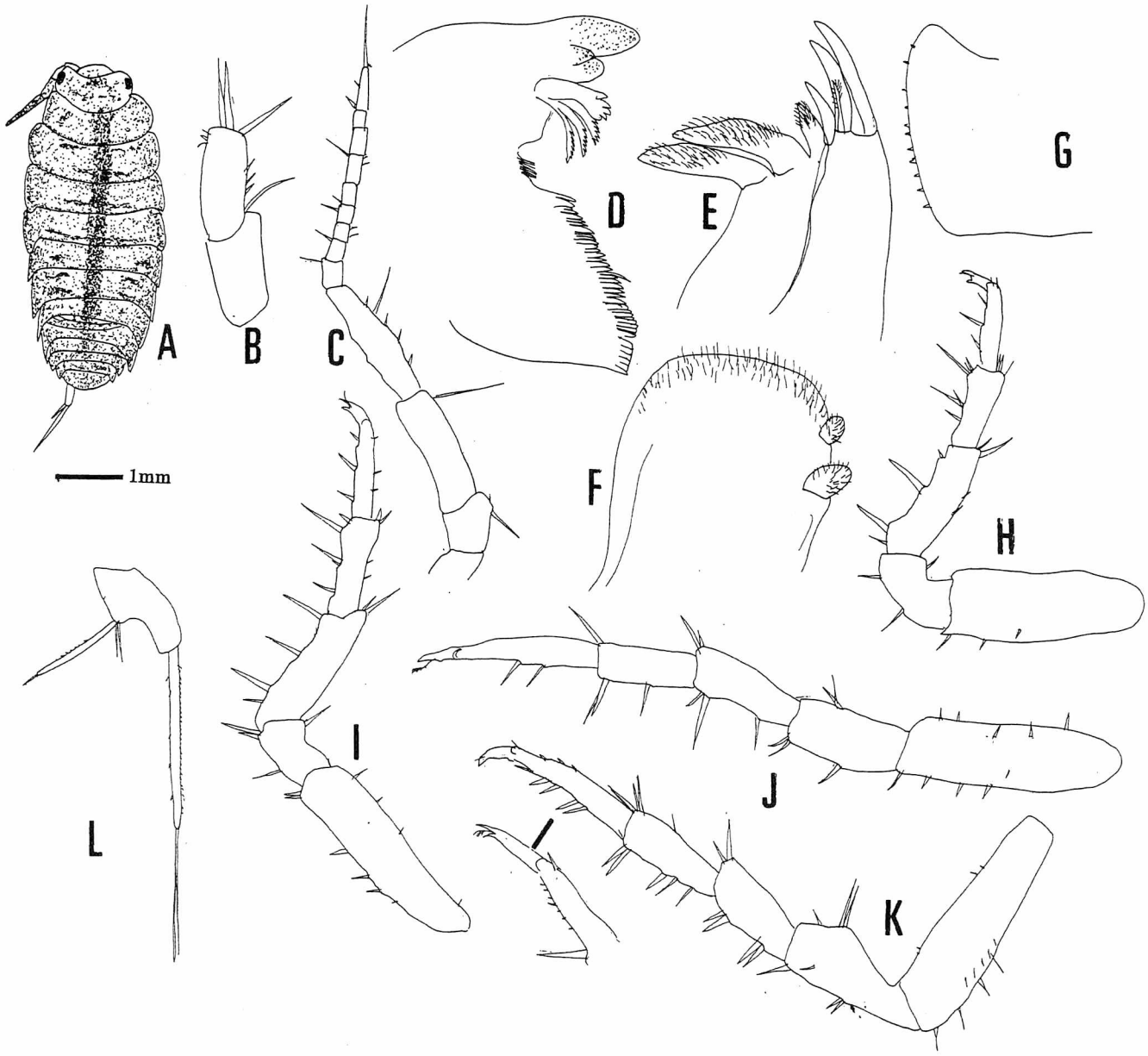

Fig.2 *Ligidium* sp.

A: Dorsal view. B: Antenule. C: Antenna. D: Right mandible. E: Maxillula. F: maxilla. G: Lateral part of pereonal somite 1. H: Pereopod 1. I: Pereopod 3. J: Pereopoed 6. K: Pereopod 7. L: Uropod (All Female from Miike, Miyakonojo-shi).

ischium 0.3 times as long as basis, with 3 setae on inner margin and a seta on outer margin; merus 1.7 times as long as ischium and outer distal angle slightly protruded, with 4 long setae on inner margin and 2 setae on outer distal angle; carpus a little shorter than merus, with 3 longer and 2 shorter setae on inner margin and 2 setae at outer distal angle; propodus a little shorter than carpus, with 3 setae on both margins.

Pereopod 6 (Fig. 2J): basis 3.3 times as long as wide, with 4-5 setae on inner margin and 5-7 setae on outer margin; ischium 3/5 as long as basis, with 3 setae on inner margin and 2 setae on near middle part of outer margin ;merus as long as ischium, with 3 setae on inner margin and 2 setae at outer distal angle; carpus a little shorter than merus, with 3 setae on inner margin and a seta at outer distal angle; propodus 1.5 times longer than carpus, with 2 setae on inner margin.

Pereopod 7 (Fig. 2K): basis 3.5 times as long as wide, with 4 setae on inner margin; ischium 2/3 as long as basis, with 2 groups of 1-2 setae on inner margin and 3 setae on outer margin; merus 3/5 as long as ischium, with 4 setae on inner margin and 2 setae at outer distal angle; carpus 1.1 times as long as merus, with 5 setae on inner margin and 3 setae at outer distal angle; propodus 1.3 times longer than carpus, with 5-6 setae on inner margin and 6-7 spines at distal area of inner margin, and 4-6 short setae on outer margin. Uropods (Fig. 2L): basis twice as long as wide; endopod twice longer than basis; exopod as long as basis.

Remarks: The present specimen is allied to *Ligidium (Nipponoligidium) koreanum*, but differs in the following features: (1) less numerous flagellar segments of antenna, (2) less numerous teeth on outer lobe of maxillula, (3) less numerous ommatidia of eyes and (4) remarkable length of exopod of uropod. Unfortunately, no male specimen has been collected and I could not find some important features. Therefore, I refrained to establish a new species.

Material examined: 1♀, near Miike, Miyazaki Pref. May 30, 2002, coll.Noboru Nunomura. This specimen is deposited at the Toyama Science Museum (TOYA Cr-12995).

Family Scyphacidae

Armadilloniscus japoniocus Nunomura, 1984

Armadilloniscus japoniocus Nunomura, 1984, pp. 6-9, figs. 32-33.

Material examined: 9♀♀, Natsui, Shibushi, Kagoshima Pref. May 27, 2002, coll. Noboru Nunomura; 2♂♂4♀♀ Sakurajima, Kagoshima Pref., June 30, 1974, coll. Noboru Nunomura.

Alloniscus balsii Verhoeff, 1928

Alloniscus balsii Verhoeff, 1928, p. 32, figs. 7-16.

Alloniscus balsii Verhoeff, 1928; Nunomura, pp. 22-28.

Material examined: 1♂♂1♀♀, Aohsima, Miyazaki-shi, Miyazaki Pref. coll. Noboru Nunomura.

Family Olibrinidae

Marinoniscus sp.

(Fig.3)

Description of male: Body 2.7 times as long as wide. Color red in alive, but pale brown in alcohol. Cephalon round. Eyes small. each eye with 4 ommatidia. Surface with small tubercles. Noduli lateralis of pereonal somites 2, and 4-6 relatively remote from lateral border. Pleon abruptly narrower than pereon.

Antennule (Fig. 3B): segment 1 rectangular; segment 2 almost square, segment 3 with 3-5 aesthetascs at the tip. Antenna (Fig. 3C) reaches the 6th pereonal somite. Mutual length of five peduncular segments is 2: 4: 4: 9: 10. Flagellum, 1.3 times longer than 5th peduncular segment, with 9 segments. Right mandible (Fig. 3D): pars incisiva 2-toothed; lacinia mobilis single-toothed; 3 plumose setae; processus molaris represented by 4 long setae. Left mandible: pars incisiva 3-toothed; lacinia mobilis 3-toothed; 3 plumose seta; processus molaris represented by 4 long setae. Maxillula (Fig. 3E); inner lobe with a seta and a protruded area on distal margin; outer lobe with 11 simple teeth on the distal margin. Maxilla (Fig. 3F) round, with many hair. Maxilliped (Fig. 3G); endite narrow, with many setae; palp

with 4 groups of dense hair.

Pereopod 1 (Fig. 3H): basis 3.2 times as long as wide; ischium 0.6 times as long as basis, with 5 long setae on inner margin and 2 setae on sternal margin; merus 0.8 times as long as ischium, with 6 setae on inner margin and a long seta at outer distal angle; carpus 1.2 times longer than merus, with 6 longer and 3-4 shorter setae on inner margin; propodus 1.3 times longer than carpus, with many hair on basal half of inner margin, 3 setae on distal half of inner margin and 10 setae on outer margin; dactylus with a long sensory setae.

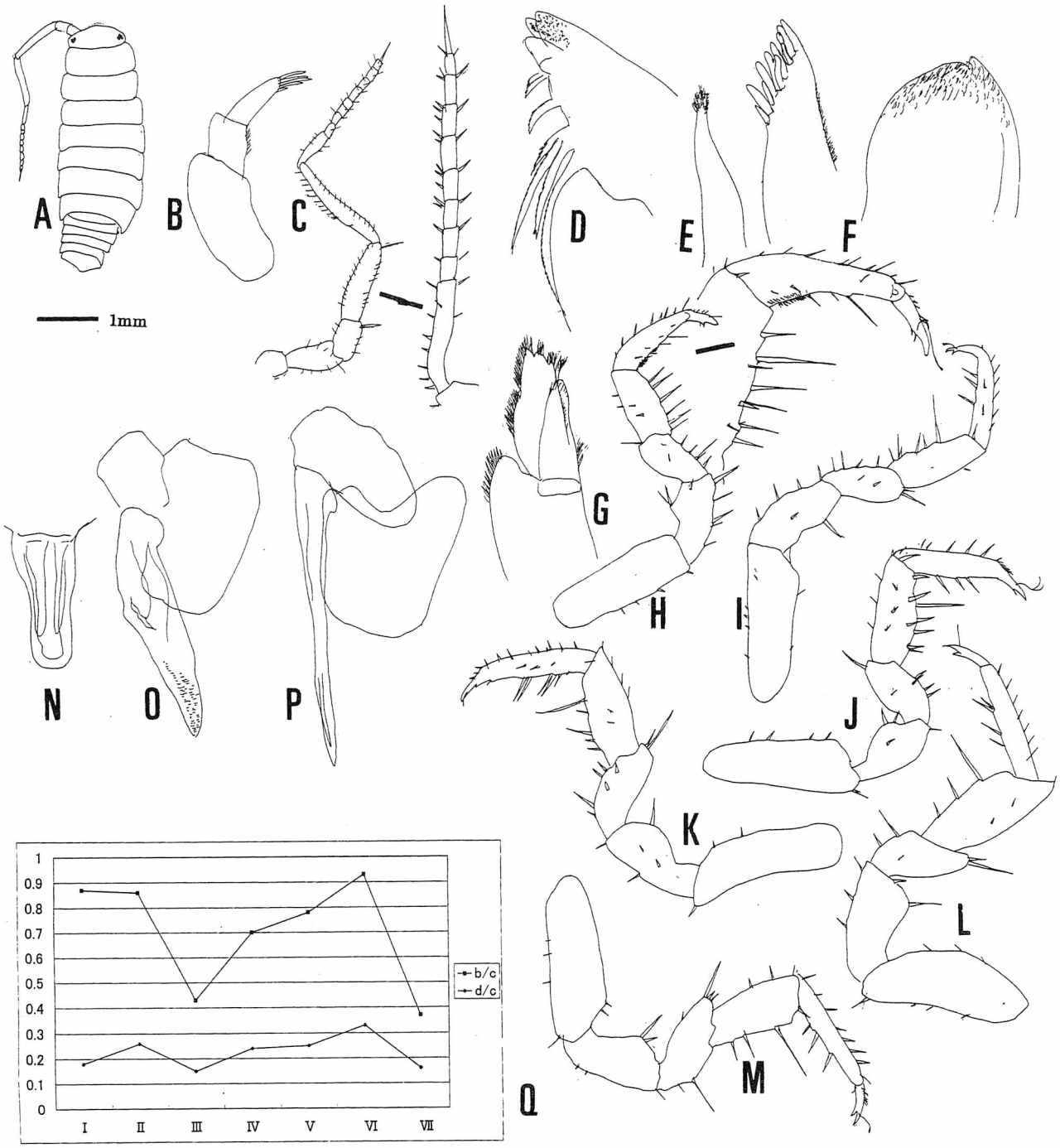

Fig.3 *Marinoniscus* sp.

A: Dorsal view. B: Antennule. C: Antenna. D: Right mandible. E: Maxillula. F: Maxilla. G: Maxilliped. H: Pereopod 1. I: Pereopod 2. J: Pereopod 3. K: Pereopod 4. L: Pereopod 6. M: Pereopod 7. N: Penes. O: Pleopod 1. P: Pleopod 2. Q: position of noduli lateralis (All: Male specimen from Kushima).

Pereopod 2 (Fig. 3I): basis 3.4 times as long as wide; ischium 0.6 times as long as basis, with 4-6 setae on inner margin and a seta on outer margin; merus 3/4 as long as ischium, with 5-7 setae on inner margin and 2 setae on outer distal angle; carpus 1.2 times longer than merus, with 7-8 setae on inner margin; propodus as long as carpus, with 3 setae on inner margin and 6-7 setae on outer margin; dactylus with a long sensory seta.

Pereopod 3 (Fig. 3J): basis 3.0 times as long as wide, with 2 setae on inner distal angle and 4 setae on outer margin; ischium 0.7 times as long as basis, with a seta at inner distal angle and 2 setae on outer distal angle; merus 0.45 times as long as basis, with 4 setae on inner margin and a seta on outer distal angle; carpus 1.4 times longer than merus, with 7-8 setae on inner margin, 3 setae on outer margin and 2 setae on distal margin; propodus as long as carpus, with 3 setae on inner margin and 5-6 setae on outer margin; dactylus with a long sensory seta.

Pereopod 4 (Fig. 3K): basis 3.6 times as long as wide, with a seta at inner distal angle and 2setae on outer margin; ischium 0.7 times as long as basis, with 2 setae on inner margin and a seta on outer margin; merus 3/4 times as long as wide, with 4 setae on inner margin and 2 setae at outer distal angle; carpus 1.4 times longer than merus, with 5 setae including a long one on inner margin and 4-5 setae on outer margin; propodus 1.1 times longer than carpus, with 5-6 setae on inner margin and 9-12 setae on outer margin; dactylus with a long sensory setae.

Pereopod 6 (Fig. 3L): basis 2.9 times as long as wide, with 4 setae on inner margin and 3 setae on outer margin: ischium 0.6 times as long as basis, with 3 setae on inner margin, and 1-2 setae on distal margin and a seta on outer margin; merus half the length of ischium, with 2 setae on inner margin and 2 setae at outer distal angle; carpus as long as ischium, with 3 setae on inner margin ; propodus as long as carpus, with 4 setae on inner margin and 7-8 setae on outer margin; dactylus with a long sensory setae.

Pereopod 7 (Fig. 3M): basis 2.9 times as long as wide, with 4 setae on inner margin and 2 setae on outer margin: ischium 0.6 times as long as basis, with 2 setae on inner margin, 2 setae on outer margin; merus 3/4 as long as ischium, with 2 setae on inner margin and 3-4 setae at outer distal margin; carpus 1.2 times longer than merus, with 4 setae on inner margin and 3 setae on outer margin ; propodus 1.2 times longer than carpus, with 3 setae on inner margin and 7-8 setae on outer margin; dactylus with a long sensory setae.

Penes (Fig. 3N) rectangular and rather short. Pleopod 1 (Fig. 3O): endopod relatively short, with transverse bar-like-structures; exopod rectangular. Pleopod 2 (Fig. 3P); endopod straight; exopod rectangular.

Female: Roughly similar to male except for copulatory apparatus.

Remarks: The present species is most closely allied to *Marinoniscus aesturai* Nunomura reported from Okinawa Island, the former is separated from the latter in the following features; (1) rectangular exopod of male pleopod 1, (2) shorter endopod of the same, (3) less numerous flagellar segments of antenna, (4) less numerous teeth on the outer lobe of maxillula, (5) rectangular exopod of male pleopod 2. But, I could not collect any perfect specimens. Therefore, I refrained to establish a new species.

Material examined: 1♂6♀♀, May, 2002, coll. Noboru Nunomura.

Family Philosciidae

Littorophiloscia nipponensis Nunomura, 1986

Littorophiloscia nipponensis Nunomura, 1986, pp. 10-12, fig. 61.

Littorophiloscia hyugaensis Nunomura, 1986, pp. 17-19, figs. 65-66.

Material examined: 1♀, Natsui, Shibushi, Kagoshima Pref. May 27, 2002, coll. Noboru Nunomura; 6♂♂4♀♀, Aoashima, Miyazaki-shi, Miyazaki Pref. Sep. 23, 1983, coll. Noboru Nunomura.

Burmoniscus japonicus (Nunomura, 1986)

Setaphora japonica Nunomura, 1986, p. 22, figs. 68-69 (I).

Material examined: 3♀♀, Maruyama, Hyuga-shi, Miyazaki Pref, Aug. 15, 2002, coll. Kunio, Nishi 2♀♀, Kusano, Hyuga-shi, Miyazaki Pref. July 30, 2002, coll. Kunio Nishi; 2♂♂2♀♀, Ibi, Nichinan-shi, Miyazaki Pref.; Shimadomari, Sata-cho, Kimotsuki-gun, Kagoshima Pref.; Chuo-kouen, Kanoya-shi, Kagoshima Pref.; Shiroyama-kouen.

Burmoniscus kagoshimaensis, n.sp.

(Fig. 4)

Description of male: Body 2.3 times as long as wide. Color brackish brown, with many paler irregular patterns. Cephalon round. Eyes mediocre in size, each eye with 15-16 ommatidia. Dorsal surface smooth. Noduli lateralis on pereonal somites 2 and 4(Fig. 4T) are remote from the lateral margin. Pleon abruptly narrower than pereonal somites. Pleonal somites triangular.

Antennule (Fig. 4B): segment 1 rectangular; segment 2 short; terminal segment with 2 aesthetascs at the tip. Antenna (Fig 4C) reaches the second pereonal somite; flagellum 3-segmented and mutual length of 3 flagellar segments is 5:3:3. Right mandible (Fig. 4D): pars incisiva 3-toothed; lacinia mobilis weakly 2-toothed; 2 penicils; processus molaris represented by a simple plumose setae. Left mandible (Fig. 4E): pars incisiva 3-toothed; lacinia mobilis 2-toothed; 2 penicils; processus molaris represented by a simple plumose seta. Maxillula (Fig. 4F): outer lobe with 10 (6 bifid + 4 simple) setae. Maxilliped (Fig. 4G) endite with 2 spurs, palp slender.

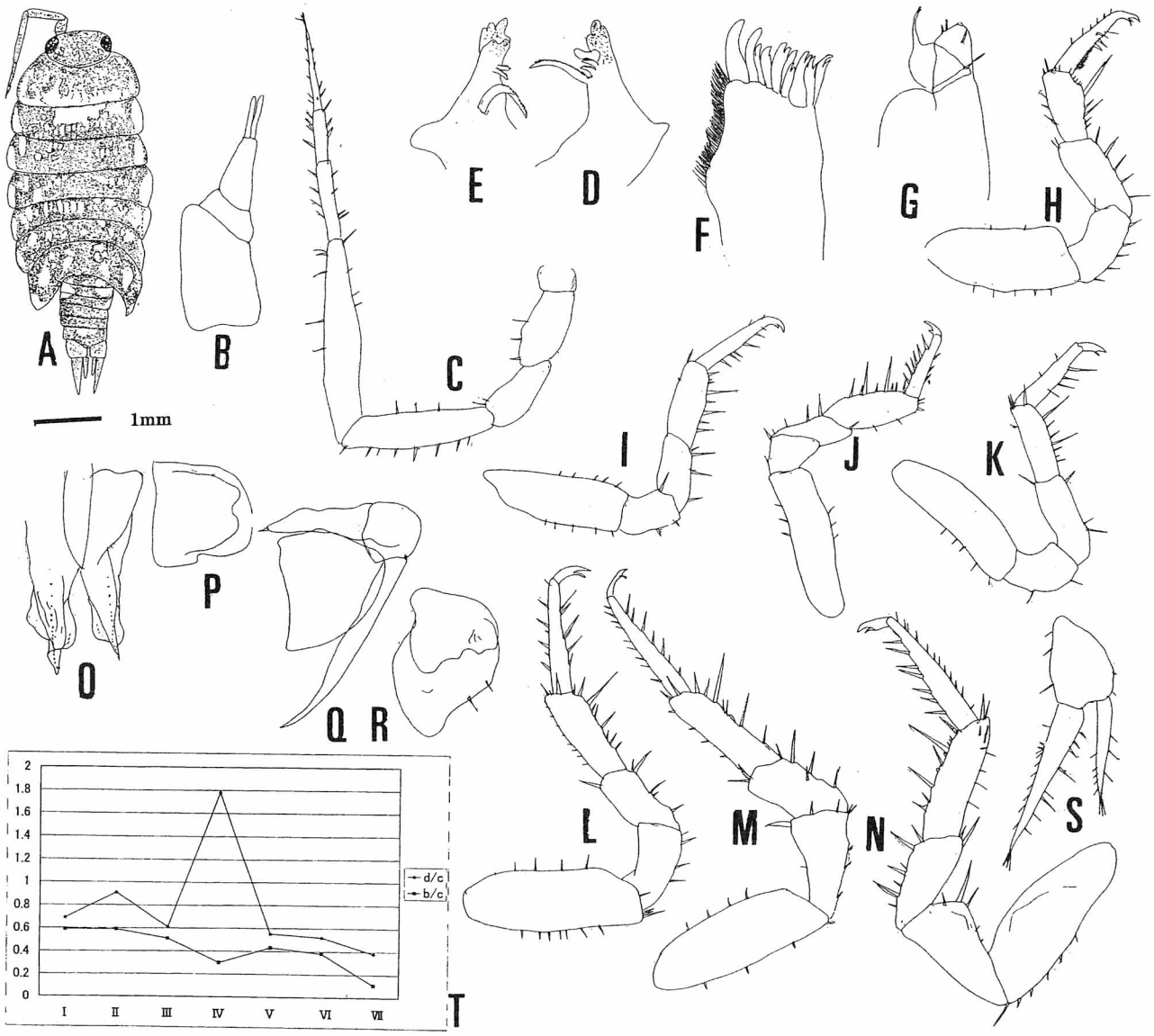

Fig. 4 *Burmoniscus kagoshimaensis* n.sp.

A: Dorsal view. B: Antennule. C: Antenna. D: Right mandible. E: Left mandible. F: Outer Lobe of maxillula G: Maxilliped. H: Pereopod 1. I: Pereopod 2. J: Pereopod 3. K: Pereopod 4. L: Pereopod 5.M: Pereopod 6. N: Pereopod 7. O: Penes and endopod of pleopod 1. P: Exopod of the same. Q: Pleopod 2. R: Pleopod 5. T: Posoition of noduli lateralis (All: Holotype male).

Pereopod 1 (Fig. 4H): basis 2.3 times as long as wide, ischium 45% as long as basis; merus a little longer than ischium, with 5-6 setae on inner margin and 2 setae at outer distal angle; carpus as long as merus, with 4 setae on basal half of inner margin, a long bifurcate seta at the middle area of inner margin and several short setae on inner distal area; propodus as long as carpus, with many short setae on basal half of inner margin and 3-4 setae on distal half of inner margin.

Pereopod 2 (Fig. 4I): basis 3.1 times as long as wide, with 5-6 setae on both margins; ischium 2/5 as long as basis, with 2 setae on inner margin and a seta at outer distal angle; merus a little longer than ischium, with 4-5 setae on inner margin; carpus 1.3 times longer than merus, with 8-9 setae on inner margin and a seta at outer distal angle; propodus as long as carpus, with 5-6 setae on inner margin.

Pereopod 3 (Fig. 4J): basis 3.2 times as long as wide, with 3 setae on both margins; ischium less than 1/3 as long as basis, with 2 setae on inner margin; merus a little longer than ischium, with 4-5 setae on inner margin and a seta at outer distal angle; carpus 4/5 as long as basis, and slightly stout, with 8-9 setae including 2 longer ones on inner margin and 7-8 setae on outer margin; propodus 3/4 as long as carpus, with 6 setae on inner margin and 3-4 setae on outer margin.

Pereopod 4 (Fig. 4K): basis 3.3 times as long as wide, with 5-6 setae on inner margin; ischium half the length of basis, with 2 setae on inner margin; merus 3/5 as long as basis, with 3 setae on inner margin and a seta at outer distal angle; carpus a little shorter than merus, with 7-8 setae on inner margin and 3-4 setae on distal margin; propodus as long as carpus, with 4 long setae on inner margin and 2-3 setae on outer margin.

Pereopod 5 (Fig. 4L) longer and stouter than the preceding ones: basis 3.2 times as long as wide, with 7-8 setae on inner margin, 3-5 setae on inner distal area and 4-8 setae on outer margin; ischium half the length of basis, with 4-5 setae on inner margin; merus a little shorter than ischium, with 5-6 setae on inner margin and a seta at inner distal angle; carpus 1.3 times longer than merus, with 8-10 setae on inner margin and 5-6 setae on distal margin; propodus 1.1 times longer than carpus, with 6 setae on inner margin and 7-8 setae on outer margin.

Pereopod 6 (Fig. 4M) a little longer than the pereopod 5: basis 3.0 times as long as wide, with 4 setae on both margins; ischium as long as basis, with 4-5 setae on inner margin and a seta at outer distal angle; merus 7/10 times as long as ischium, with 4-5 setae on inner margin and 2 setae at outer distal angle; carpus 1.6 times longer than merus, with 3 longer and several shorter setae on inner margin and 6-8 setae on outer margin; propodus as long as carpus, with 7 setae on inner margin and 9-10 setae on outer margin.

Pereopod 7 (Fig. 4N): basis 2.8 times as long as wide, with 5-7 setae on inner margin and a seta at inner distal angle; ischium 3/4 as long as basis, with 5 setae on outer margin; merus 2/3 as long as ischium, with 7-8 setae on inner margin and 2 setae at outer distal angle; carpus 1.4 times longer than merus, with 6-7 longer and several shorter setae on inner margin and 4-5 setae on outer margin and 2 setae at outer distal angle; propodus as long as carpus, with 7 setae on inner margin and 12 setae on outer margin.

Penes (Fig. 4O) fusiform. Pleopod 1 :endopod (Fig. 4O) pointed and with 2 flap-like structures on both sides and a series of 28-30 denticles; exopod (Fig. 4P) semicircular. Pleopod 2 (Fig. 4Q): endopod straight and tapering toward the tip; exopod semicircular. Uropod (Fig. 4S); basis rectangular, and 1.6 times as long as wide, with 3 setae on inner margin; endopod a little longer than basis; exopod 1.8 times longer than endopod.

Female: Roughly similar to male except for copulatory apparatus. Among the specimens examined, 8 gravid females were found and each female has 10-12 eggs in her brood pouch.

Remarks: The present new species is closely allied to *B. okinawaensis* Nunomura, collected from Okinawa Island, but the former is separated from the latter in the following features: (1) shape of lappet-like stuctue of male pleopod 1, (2) remoter position of noduli lateralis on personal somite 4, (3) nearer position of noduli lateralis on personal somite 2. (4) shape of postero-lateral margin of pereonal somite 7, (5) longer uropod and (6) absence of bifid setae on pereopod 1.

Material examined: 3 ♂♂ (1♂ holotype, 4.6mm in body length and 2♂♂ paratypes, 4.2-5.1mm in body length) and 31 ♀♀ (1♀ allotype, 6.9mm in body length, and 30♀♀, 5.1-6.0mm in body length), Izashiki, Sata-cho,

Kagoshima Pref. May 29, 2002, coll. Noboru Nunomura.

Type series is deposited as follows: Holotype (TOYA Cr-12967), allotype (TOYA Cr-12968) and 11 paratypes (TOYA Cr-12969-12979) at the Toyama Science Museum, 10 paratypes (OMNH Ar-5899-5908) at the Osaka Museum of Natural History, 11 paratypes (NSMT Cr-15165) at the National Science Museum, Tokyo.

Other specimens examined are as follows: 2♀♀, entrance to Nishikata, Sata-cho, Kagoshim Pref., coll.Noboru Nunomura; 11♀♀, Lauer forest, Cape Sata, Sata cho, Kagoshima Pref., coll. Noboru Nunomura; 6♀♀ Bansho bana, Eicho. Kagoshima Pref., coll. Noboru Nunomura; 7♀♀, foot of Mt. Kaimon-dake, Kaimon-Cho, Kagoshima Pref., coll.Noboru Nunomura; 2♀♀, Tomari, Bou machi, Kagoshima Pref. May 29, 2002, coll. Noboru Nunomura; 2♀♀ Kitadamachi, Kanoya, Kagoshima Pref. May 27, 2002, coll. Noboru Nunomura; 1♀ foot of Mt. Uomidake, Ibusuki-shi, Kagoshima Pref. May 29, 2002, coll. Noboru Nunomura; 3♀♀, Kusano, Bounotsu, machi, Kagoshima Pref. 29, 2002, coll. Noboru Nunomura; 5♀♀, Sewaki, Nijime-machi, Kagoshima Pref., May 27,2002 coll.Noboru Nunomura; 4♀♀, Kohama, Ibusuki-shi, Kagoshima, Pref. Sep. 2, 1983, coll. Minako Terada; 6♀♀, Laurel forest, Aya-cho, Miyazaki Pref. May 26, 2002, coll. Noboru Nunomura; 7♀♀, Takamatsu, Kushima-shi, Miyazki Pref. May 27, 2002 coll. Noboru Nunomura.

Burmoniscus dasystylus sp. nov.,

(Fig.5)

Description of male: Body 2.5 times as long as wide. Color pale brown, with irregular paler patterns. Cephalon ellipse. Eyes rather big, each eye with 15-16 ommatidia. Dorsal surface smooth. Noduli lateralis on 2nd and 4th pereonal somites are relatively remote from the lateral margin. Pleon abruptly narrower than pereonal somites. Pleotelson triangular.

Antennule (Fig. 5B): segments 1 rectangular; segment 2 relatively short; terminal segment with 6 aesthetecs along lateral margin. Antenna (Fig. 5C) reaches the anterior area of pereonal somite 3; flagellum 3-segmented, and mutual length of 3 flagellar segment is 4:2:3. Right mandible (Fig. 5D): pars incisiva 3-toothed; lacinia mobilis is single-headed; a hairy bristle; processus molaris represented by a single plumose seta. Left mandible (fig. 5E): pars incisiva 3-toothed: lacinia mobilis weakly 2- headed, a hairy bristle; processus molaris represented by a single plumose seta. Maxillula (Fig. 5F): inner lobe with 2 round plumose setae on distal margin; outer lobe with 10 teeth including 3 bifid one on distal margin. Maxilliped (Fig. 5G): endite round with a bigger seta and many hair; palp rather narrow.

Pereopod 1 (Fig. 5H): basis 2.5 times as long as wide, with 8-9 setae on inner margin and 6-8 setae on outer marin; ischum 3/5 times as long as basis, with 5-6 setae on inner margin and 2 setae on outer margin; merus as long as ischium, with 7 long setae on inner margin and 5-7 setae on outer margin; carpus almost as long as merus, with 8 setae including a longer one on inner margin, 5-6 setae on outer margin and 2 setae on distal margin, and many short setae on lateral area; propodus a little longer than carpus, with many setae on basal half of inner margin and 3 setae on distal half of the same, 5-6 setae on outer margin.

Pereopod 2 (Fig. 5I): basis 3.3 times as long as wide, with 3 setae on inner margin and 2 setae on outer margin; ischum half the length of basis, with 3-4 setae on inner margin and a seta on outer margin; merus 5/6 as long as ishium, with 6-7 setae on inner margin and 3 setae on distal outer area, and 10-11 setae on outer margin; carpus 1.2 times longer than merus, with 6-7 long setae on inner margin and 4 longer and many shorter setae on outer margin; propodus 85% as long as carpus, with 5 setae on inner margin and 5-7 setae on outer margin.

Pereopod 3 (Fig. 5J): basis 2.8 times as long as wide, with 5-7 setae on inner margin and 4-6 setae on outer margin; ischum half the length of basis, with 7-8 setae on inner margin; merus a little longer than ischium, with 6-8 setae on inner margin; carpus 1.2 times longer than merus, with 6-8 longer setae on inner margin; and 3-4 shoter on distal margin propodus a little longer than the carpus, with 7 setae on inner margin and 4-5 setae on outer margin.

Pereopod 4 (Fig. 5K): basis 3.6 times as long as wide, with 6-7 setae on inner margin and 7-8 setae on outer margin; ischium less than half the length of basis; merus 2/5% as long as basis, with 5 setae on inner margin and 7-8 setae on outer margin; carpus 1.3 times longer than merus, with 5 long setae on inner margin; propodus as long as

carpus, with 5 long setae on inner margin and 6-7 setae on outer margin.

Pereopod 5 (Fig. 5L): basis 3.0 times as long as wide, with 7 setae on inner margin and 6-7 setaeon outer margin; ischum half the length of basis, with 4-6 setae on innner magin and 3-5 including a long one on outer margin; merus as long as iscihum, 8-10 setae on inner margin and a seta at outer distal angle; carpus 1.4 times as long as wide, with 8 long setae on inner margin and 3 setae atouter distal angles; propodus a little longer than carpus, with 8-12 setae on inner margin and 10-11 setae on outer margin.

Pereopod 6 (Fig. 5M): basis 2.5 times as long as wide, with 3-5 setae on inner margin, and 4-5 setae on outer

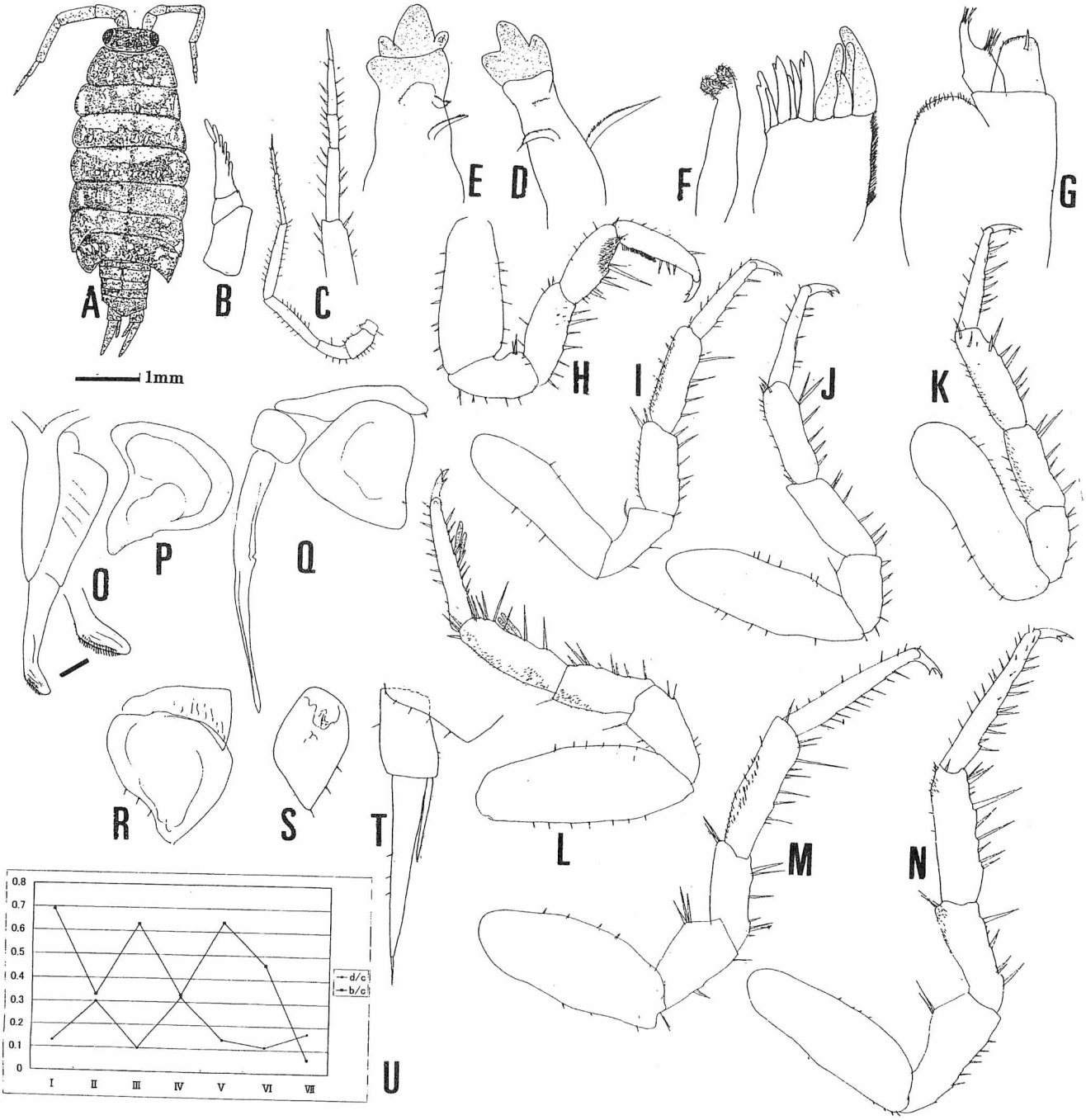

Fig. 5 *Burmoniscus dasystylus* n.sp.

A: Dorsal view. B: Antennule. C: Antenna. D: Right mandible. E: Maxillula. F: Maxilla. G: Maxilliped. H-N: Pereopods 1-7. P: Penes. Q: Pleopod 1. P: Pleopod 2: Pleopod 2, R: Pleopod 3, S: Pleopod 5, T: Uropod, U: Position of noduli lateralis, (All: Holotype male).

margin; ischium 2/3 as long as basis, with 3-6 setae on inner margin and 3 setae on sternal margin; merus 3/4 as long as ischium, with 7-8 relatively long setae on innner margin and 2 setae at outer distal angle; carpus 1.4 times longer than merus, with 10 setae on inner margin; propodus almost as long as capus, with 9-10 setae on bath margins.

Pereopod 7 (Fig. 5N): basis 3.0 times as long as wide, with 4-6 setae on inner magin and 4 setae on outer margin; ischium 2/3 as long as basis, with 7-8 setae on inner margin and 2 long setae on sternal margin; merus a little shorter than ischium, with 8-10 setae on inner magin and 2 setae at outer disatal angle; carpus as long as ischium, with 12-14 setae on inner margin; propodus 1.2 times longer than carpus, with 10-11 setae on inner margin and 13-14 setae on outer margin.

Penes (Fig. 5O) fusiform. Pleopod 1 (Fig. 5O): endopod with apical area bent outward, bearing 2 dense rows of denticles; exopod (Fig. 5P) rounded and semicircular. Pleopod 2 (Fig. 5Q): endopod straight, tapering towards the tip; exopod rounded triangular. Pleopod 3 rounded triangular. Pleopod 4 a little narrower than pleopod 3. Pleopod 5 (Fig. 5R) smaller and narrower than the preceding 4 pairs. Uropod (Fig. 3S): basis rectangular, 1.6 times as long as wide; endopod small, almost as long as basis; exopod 2.1 times longer than endopod, with a long seta at the tip.

Female: Roughly similar to male except for copulatory apparatus.

Ecology: This species occurs in laurel forests and shore forests. A gravid female with 15 eggs in her brood pouch.

Etymology: *dasy* = desnly hairy, *stylus* = stilus. This species has a densely hairy apical area of endopod of male plopod 1.

Remarks: The present new speicies is separated from *B. okinawaensis*, in the following features; (1) shape of apical part of endopod of male pleopod 1, (2) absence of bifid setae on all the pereopod, longer endopod, (4) remote position of noduli lateralis on pereonal somites 2 and 4 and (5) numerous aesthetascs of antennule.

Material examined: 1♂ (holotype, 6.7mm in body length) and 17 ♀♀ (1♀ allotype, 9.5mm in body length and 16♀♀ paratypes, 7.8-10.5mm in body length), Takamatsu, Kushima-shi, Miyazaki Pref. May 27, 2002, coll. Noboru Nunomura. Type series is deposited as follows: Holotype (TOYA Cr-12980), allotype (TOYA Cr-12981) and 4 paratypes (TOYA Cr-12982-12985) at the Toyama Science Museum, 5 paratypes (OMNH Ar-5909-5913) at the Osaka Museum of Natural History, 4 paratypes (NSMT Cr-15166) at the National Science Museum, Tokyo.

Other specimens examined are as follows; 1♀, foot of Mt Kaimon-dake, Kaimon-cho, Kagoshima Pref., May 29, 2002, coll. Noboru Nunomura, 1♀, Minamikata Ibusuki-shi, Kagoshima Pref., May 29, 2002, coll Noboru Nunomura, 1♂ 9♀♀. foot of Mt. Uomidake, Kagasikata, Ibushuki-shi, Kakosima Pref., May 29, 2002, coll. Noboru Nunomura.

Family Oniscidae

Exalloniscus sp.

(Fig.6)

Description of male; Body 2.1 times as long as wide. Color white in alcohol. Dorsal surface distinctly granulated. Cephalon (Fig. 6B) short, 1/4 as long as wide. Eyes small, each eye with 4 ommatidia. Posterior half of body abruptly narrower than anterior half. Pleotelson triangular.

Antennule (Fig. 6C): segment 1 rectangular; segment 2 relatively short; segment 3 with 6 aesthetascs at the tip. Antenna (Fig. 6D) reaches the anterior margin of pereonal somite 2; flagellum 3-segmented and mutual length of each flagellar segment is 7:5:7. Right mandible (Fig. 6E): pars incisiva 3-toothed; lacinia mobilis weakly 2-headed; 2 hairy bristles processus molaris represented by a single plumose seta. Left mandible (Fig. 6F): pars incisiva 4-toothed; lacinia mobilis 3-tooted; 3 hairy bristles; processus molaris represented by a tuft of setae. Maxillula (Fig. 6G): outer lobe with 10 teeth on distal margin. Maxilliped (Fig. 6H): endite rectangular, with a spur on distal margin and a relatively long setae; palp rather slender.

Pereopod 1 (Fig. 6I): basis 3.0 times as long as wide, with 5-6 setae on inner margin and 3-5 setae on outer marign; ischium 3/5 as long as basis, with 3-4 setae on inner margin and 2 setae at outer distal angle; merus 4/5 as long as ischium, with 1-2 setae on inner margn and a seta at outer distal angle; carpus 1.1 times longer than merus, with 5-6 setae on inner margin; propodus 1.2 times longer than carpus, with 5 long setae on inner margin and 8-11

seate on outer margin; dactylus with a dactyl organ.

Pereopod 2 (Fig. 6J): basis 3.0 times as long as wide, with 8-10 short setae on inner margin; ischium with 7-8 seteae on inner margin; merus 4/5 as long as ischium, with 4-7 setae on inner magin, 2 setae at outer distal angle; carpus almost as long as merus, with 7-8 setae including a distal long one on inner margin; propodus 4/5 as long as carpus, with 5 setae on inner margin and 4 groups of short setae on outer margin.

Pereopod 3: basis 3.0 times as long as wide, with 4 setae on inner margin and 6 setae on outer margin; ischium 2/5 as long as wide, with 6 setae on inner margin and a seta at outer distal angle; merus as long as ischium, with 5 longer and a few of setae on inner margin and 2 setae at outer distal angle; carpus 1.2 times longer than carpus, with 8 setae including 2 long distal ones on inner margin margin and 4 groups of trifid short setae on outer margin; propodus as long as carpus, with 5-6 setae on inner margin and 4 groups of trifid short setae on outer margin.

Pereopod 4 (Fig. 6K): basis 3.4 times as long as wide, with 5 setae on both margins; ischium 4/5 as long as wide,

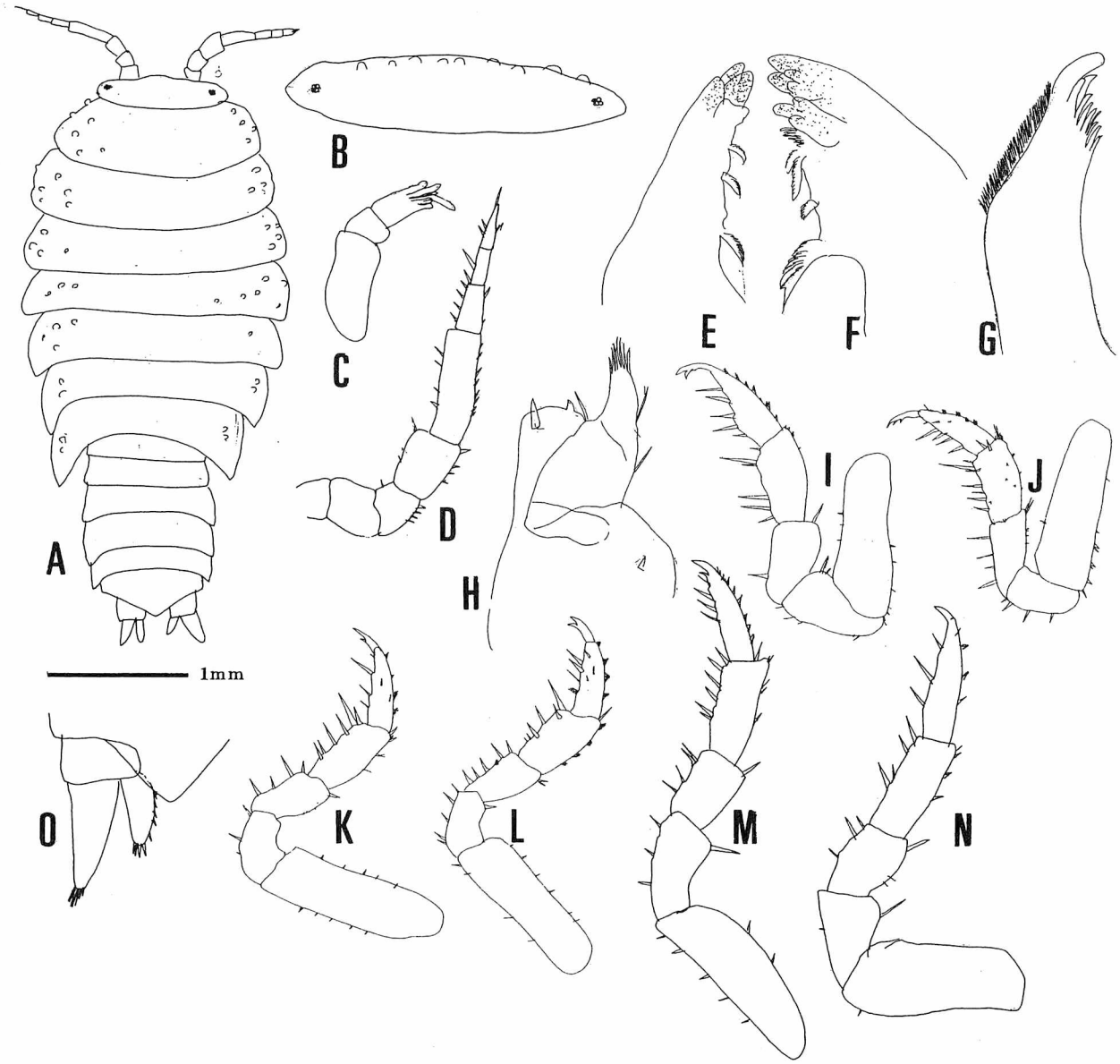

Fig. 6 *Exallonicus* sp.

A: Dorsal view. B: Cephalon. C: Antennula. D: Antenna. E: Right mandible. F: Left Mandible. G: Maxillula. H: Maxilliped. I: Pereopod 1. J: Pereopod 2. K: Pereopod 4. L: Pereopod 5. M: Pereopod 6. N: Pereopod 7. O: Pleopod (All: Femele specimen from Aya).

with 3-4 setae oninner margin; merus 1.1 times longer than ischium, with 4 setae on inner margin and a seta at outer distal angle; carpus 1.2 times as loing as merus, with 6 setae on inner margin and 5 setae on outer margin; propodus a litle shorter than carpus, with 3-4 setae on inner marign and 4 short setae.

Pereopod 5 (Fig. 6L): basis 3.2 times as long as wide, with 4-7 setae on both margins; ischium 2/5 as long as basis, with 3 setae on inner margin; merus as long as ischim, with 5-6 setae on inner margin and 2 setae on outer margin; carpas 1.2 times longer than merus, with 6 setae on inner margin and 4 groups of short setae; propodus as long as carpus, eith 7-8 setae on 4 groups of short setae.

Pereopod 6 (Fig. 6M): basis 3.2 times as long as wide, with 6 setae on inner margin and 1-2 setae on outer margin; ischium half the length of basis, with 3 setae on inner margin and a seta at outer margin; merus 3/4 as long as ischium, with 4 setae on inner margin and a seta at outer distal angle; carpus 1.2 times longer than merus, with 6-7 setae on inner margin and 5-6 setae on outer margin; propodus as long as carpus, with 4-5 setae on inner margin and 8-9 groups of short setae on outer margin.

Pereopod 7 (Fig. 6N): basis 2.3 times as long as wide, with 2 setae at inner distal angle; ischum 3/5 as long as basis, with 1-2 setae on inner margin and a setae on sternal margin; merus 4/5 as long as ischium, with 3 setae on inner marin and 2-3 setae on outer margin; carpus 1.5 times longer than merus, with 3-6 setae on inner margin and 3-4 setae on outer margin; propodus a little longer than carpus, with 3-4 setae on inner margin and 3-5 groups of setae on outer margin.

Uropod (fig. 6O): basis short, 0.6 times as long as wide; endopod 1.4 times longer than basis, with a tuft of short setae at the tip; exopod 1.5 times longer than endopod, with a tuft of short setae at the tip.

Remarks: The present specimen is closely allied to *E. cortii Arcangeli*, but this specimen is separated from *cortii* in the following features: (1) elliopsoid cephalon, (2) smaller and less numerous ommatidia of eyes, (3) numerous aesthetascs at the tip of antennula. Unfortunately no male specimen has been collected, Therefore, I refrained to establish a new species.

Material examined: 1♀ (3.9mm in body length), laurel forest of Aya, Miyazaki Prefecture. This specimen is depositea at the Toyama Science Museum (TOYA Cr-12996).

Family Trachelipidae

Lucasioides nichinanensis, n.sp.

(Fig.7)

Description of male: Body 2.2 times as long as wide. Color brown, each pereonal somite with a pair of lateral paler patterns and several irregular paler patterns on dorsal surface. Dorsal surface weakly granulated. Cephalon with medial process (Fig. 7D) triangular in frontal view. Eyes mediocre in size and each eye with 12 ommatidia. Noduli lateralis of all the pereonal somites rather near from lateral margin. Pleotelson triangular, without lateral concavity on both margins.

Antennule (Fig. 7B): second segment rather short; terminal segment with 4-5 aesthetacs on distal margin. Antenna (Fig. 7C) reaches the posterior half of pereonal somite 2; flagellum rather short, as long as the fifth peduncular segment; relative length of 2 flagellar segments is 1:1.2.

Right mandible (Fig. 3E): pars incisiva 4-toothed; lacinia mobilis only weakly 3-lobed; 2 hairy bristles; processus molaris represented by a tuft of setae. Left mandible (Fig. 3F): pars incisiva 3-toothed; lacinia mobilis 3-toothed; 3 hairy bristles; processus molaris represented by a tuft of setae. Maxillula (Fig. 3G): outer lobe with 10 simple setae Maxilla (Fig. 3H) wide, with many hair. Maxilliped (Fig. 3I): endite with 3 shorter and a longer spurs on distal area; palp relatively stout.

Pereopod 1 (Fig. 3J): basis 3.0 times as long as wide, with 7-8 setae on inner margin and 6-8 setae on outer margin; ischium 2/5 as long as basis, with 6-8 setae on inner margin and 1-2 setae on outer margin; merus as long as ischium, with more than 20 setae on inner margin and several setae on outer distal area; carpus 1.3 longer than merus, with more than 30 setae on inner margin, and a long seta at outer distal area; propodus 0.6 times longer than carpus,

with 20-22 setae and 10-12 setea on outer margin.

Pereopod 2 (Fig. 7K): basis 3.6 times as long as wide, with 12-14 setae on inner margin, 6-8 of these are at near the distal corner, 12-13 short setae on outer margin; ischium about 1/2 as long as basis, with 4-7 setae on inner margin and 2 relatively long setae on outer margin; merus a little shorter than ischium, with 17-20 setae on inner margin and

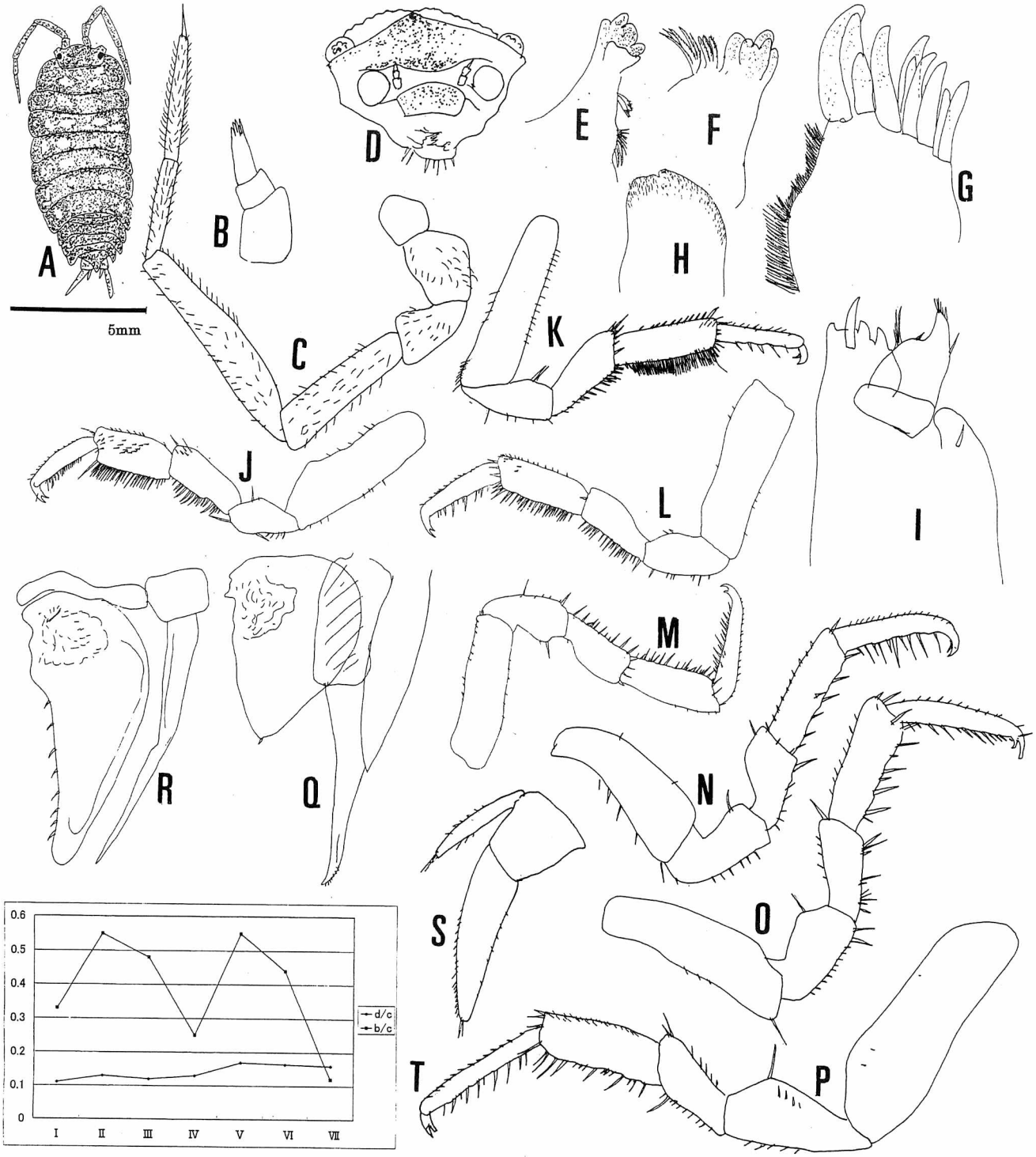

Fig. 7 *Lucasioides nichinanensis* n.sp.

A: Dorsal view. B: Antennule. C: Antenna. D: Fronatal view of cephalon. E: Right mandible. F: Left mandible. G: Outer of maxillula. H: Maxilla. I: Maxilliped. J-P: Pereopods 1-7. Q: Penes and pleopod 1. R: Pleopod 2: S; Uropods. T: Position of noduli lateralis (All: Holotype male).

5-8 setae at outer distal angle; carpus 1.2 times as long as merus, with many setae on inner margin, 4-5 setae on distal margin and more than 15 setae on outer margin; propodus 0.7 times as long as carpus, with 5-6 setae on inner margin, and 9-11 setae on outer margin.

Pereopod 3 (Fig. 7L): basis 2.9 times as long as wide, ischium 2/5 as long as basis, with 8-9 setae on inner margin and 2 setae on outer margin; merus almost as long as ischium, with 18-20 setae on inner margin; carpus a little longer than merus, with 27-30 setae on inner margin, 20-23 setae on outer margin and 5-6 long setae on distal margin; propodus as long as carpus, with 12 setae on inner magin and 15-16 setae on outerh margins.

Pereopod 4 (Fig. 7M): basis 3.1 times as long as wide, 5-6 on inner margin and 9-17 setae on outer margin; ischum 3/5 as long as basis, with 10-12 setae on inner margin; merus 3/4 as long as ischium, with 13-16 setae on inner margin and 2 setae at outer disatal angle; carpus 1.4 times longer than merus, with 20-22 setae on inner margin; propodus as long as carpus, with 12-16 setae on inner margin and 8-20 setae on outer margin.

Pereopod 5 (Fig. 7N): basis 2.8 times as long as wide, with 5-6 setae on inner margin and 2 setae on outer margin; ischum 2/3 as long as basis, with 7-8 setae on inner margin and a seta on outer margin; merus 2/3 as long asischium, with 6-10 setae on inner margin and 2-3 setae on distal margin; carpus 1.6 times as long as merus, with 6-9 setae on inner margin and 10-12 setae on outer margin; propodus almost as long as carpus, with 10 setae on inner margin and 16-18 setae on outer margin.

Pereopod 6 (Fig. 7O): basis 3.5 times as long as wide, with a seta at inner distal area; ischium 55% as long as wide, with 11-12 setae on inner margin and a seta at outer distal angle; merus as long as ischium, with 9-11 setae on inner margin and 6-7 setae on outer margin; carpus 1.4 times longer than merus, with 8-9 setae on inner margin, 3-4 setae on distal margin and 8-10 setae on outer margin; propodus a little longer than carpus, with 10-12 setae on inner margin and 12-13 setae on outer margin.

Pereopod 7 (Fig. 7P): basis 3.1 times as long as wide; ischium 0.6 times as long as wide, with 5-6 setae on inner margin and a seta on sternal margin; merus 0.6 times as long as ischium, with about 10 setae including a long one on inner margin and 7-8 setae on outer margin; carpus 1.5 times longer than merus, with 15-17 setae on inner margin and 3 setae on outer distal angle; propodus 1.1 times longer than carpus, with 10 setae on inner margin and 15-17 short setae on outer margin.

Penes (Fig. 7Q) elliptical. Pleopod 1 (Fig. 7Q): endopod straight and apical part bent outwards, apical area with a series of 7～8 denticles along the inner margin; exopod lanceolate, without any concavity.

Pleopod 2 (Fig. 7R) : endopod slender but relatively short; exopod elongated triangular, with 10-11 denticles on outer margin. Uropod (Fig. 7S): basis rectangular, 1.2 times as long as wide, endopod slender, 1.5 times as long as basis; exopod 1. 5 times as long as wide.

Female: Roughly similar to male except for copulatory apparatus.

Remarks: The present new species is most closely allied to *Lucasioides nishimurai* (Nunomura), but the former is separated from the latter in the following features: (1) absence of any concavity on exopod of male pleopod 1, (2) shorter endopod of male pleopod 2, (3) position of noduli lateralis of peroponal somites 2-3, (4) shorter and narrower propodus of Pereopod 1 and (5) more aesthetacs on antennule.

Material examined: 4♂♂ (1♂ holotype, 8.2mm in body length and 3♂♂ paratypes, 7.6-9.0mm) and 7 ♀♀ (1♀ allotype, 13.4mm in body length and 6♀♀ paratypes, 9.0-11.3mm in body length), Aburatsu Cape, Miyazaki May, 26, 2002. coll. Noboru Nunomura. Type series is deposited as follows: Holotype (TOYA Cr-12980), allotype (TOYA Cr-12981) and 4 paratypes (TOYA Cr-12982-12985) at the Toyama Science Museum, 3 paratypes (OMNH Ar-5914-5916) at the Osaka Museum of Natural History, 3 paratypes (NSMT Cr-15167) at the National Science Museum, Tokyo.

Other specimens examined are as follows: 1♂, Takamatsu, Kushima-shi, Miyazaki Pref., May 27, 2002, coll. Noboru Nunomura; 2♂♂ Takachiho, alt 920m, Makizomo-machi, Kagoshima Pref. May 30, 2002; 3♂♂9♀♀, Higashikata, Ibusuki-shi, Kagoshima Pref., May 29, 2002, coll, Noboru Nunomura; 2♀♀, Niashigata 40m, Sata-cho, Kagoshima Pref. May 28, 2002, coll. Noboru Nunomura; 1♀, foot of Mt. Kaimon-dake, Kaimon-cho, Kagoshima Pr

ef., May 29, 2002; 1♀. Hinokami-park, Makurazaki-shi, Kagoshima Pref. May 29, 2002, coll. Noboru Nunomura; 2♂♂5♀♀, Aug. 24, 2002, Oike, Miyakonojou-shi, Miyazaki Pref. coll. Kunio Nishi.

Mongoloniscus satumaensis (Nunomura, 1987)

Protracehoniscus satumaensis Nunomura, 1987

Material examined: 1♂6♀♀, Shigetomi, Aira-cho, Kagoshima Pref., July 2, 1981, Noboru Nunomura; 1♂3♀♀, Kohama, Ibusuki-shi, Kagoshima Pref. July 2, Minako Terada.

Family Porcellionidae

Porcellionides pruinosus (Blandt, 1833)

Porcellio pruinosus Blandt, 1833. p181.

Metoponorusu pruinosus (Blandt, 1833) Vandel, 1966.

Porcellionides pruinosus Blandt, 1833; Nunomura, 1987, pp. 73-76. fig. 135.

Material examined: 2♂♂4♀♀, Ohdomari, Sata-cho, Kagoshima Pref., May 29, 2002, coll. Noboru Nunomura; 1♂3♀♀, Miyazaki, Kinokami-park, Makurazaki-shi, Kagoshima Pref., May 30, 2002, coll. Noboru Nunomura.

Family Armadillidae

Venzillo dorsalis Iwamoto, 1943

(Fig. 8)

Armadillo dorsalis Iwamoto, 1943

Spaherillo dorsalis (Iwamoto, 1943) Nunomura, 1990, pp. 13-15 fig. 143.

Venezillo dorsalis (Iwamoto, 1943) Nunomura, 1999, pp. 83-84, 89.

Description of male: Body 2.2 times as long as wide. Color blackish with many paler irregular patterns. Dorsal surface smooth. Schisma of first pereonal somite well developed. Second pereonal somite with a big tooth. Anterior line of cephalon slightly rounded and protruded to laterally. Eyes with 12-14 ommatidia. Pleotelson hour-glass-shaped.

Antennule (Fig. 8B): terminal segment with 3-4 aesthetascs at the tip. Antenna (Fig. 8C) reaches the personal somite 1; flagellum 3/4 as long as the fifth peduncular segment, mutual length of 2 flagellar segment is 1:3. Right mandible (Fig. 8F): pars incisiva 3-toothed; lacinia mobilis represented by a single tooth; 2 hairy bristles; processus molaris represented by a single hairy bristle. Left mandible (Fig. 8F): pars incisiva 3-headed; lacinia mobilis 2-headed; processus molarisrepresented by a single plumose seta. Maxillula (Fig. 8G): inner lobe with 2 rounded plumose setae at the tip; outer lobe with 10 simple teeth on the distal margin. Maxilliped (Fig. 8H): short; endites mall; palp rather stout.

Pereopod 1 (Fig. 8I): basis 3.4 times as long as wide, with 10 setae on inner magin and 6 setae on outer margin; ischum 56% as long as basis, with 6-7 setae on inner margin; merus 2/3 as long as ischium, with 11-12 setae including a long one on inner margin, 3 setae on outer margin; carpus as long as merus, with 5 long and a trifid setae on inner magin; 8-10 setae on outer margin; propodus a little longer than carpus, with many fine setae on basal half of inner margin, 4 setae on distal half of inner margin, 6-10 setae on outer margin.

Pereopod 2 (Fig. 8J): basis 4.6 times as long as wide, with 15-16 setae on inner margin and 10-12 setae on outer margin; ischium 45% as long as basis, with 10-12 setae on inner margin; merus 3/4 as long as ischium, with 4 longer and 4-6 shorter setae on inner margin and 2 setae at outer distal angle; carpus 1.5 times longer than merus, with 5-7 longer and several shorter setae on inner margin, 12-15 short setae on outer margin and 3-6 setae on distal margin; propodus 1.2 times longer than carpus, with 5 relatively long setae, and 11-13 setae on outer margin.

Pereopod 3 (Fig. 8K): basis 4.4 times as long as basis, with 9-10 setae on inner margin and 4-6 setae on outer margin; ischum half the length of basis, with 3-6 setae on inner margin and 3 setae on outer margin; merus 2/3 as long as ischium, with 8 longer and several shorter setae on innner margin and 3 setae on outer distal area; carpus 1.9 times as long as merus, with 9-10 longer and some shorter setae on inner margin and 11-15 setae on outer margin;

propodus as long as carpus, with 7-8 setae on inner margin and 7-8 setae on outer margin.

Pereopod 4 (Fig. 8L): basis 4.0 times as long as wide, with 12-13 setae on inner margin and 8 setae on outer margin, ischium half the length of basis, with 2 setae on inner margin and 3-5 setae on outer margin; merus half the length of ischium, with 5 setae on inner margin and a seta at inner distal angle; carpus 1.7 times as long as merus, with 4-5 long setae on inner margin and 2-3 setae on distal margin and 16-18 setae on outer margin; propodus 1.2 times longer than carpus, with 5 setae on inner margin and 8 setae on outer margin.

Pereopod 5 : basis 3.9 times as long as wide, with 6 setae on inner margin and 2-3 setae on outer margin; ischium half the length of basis, with a seta on inner margin; merus 55% as long as ischium, with 4 longer and some

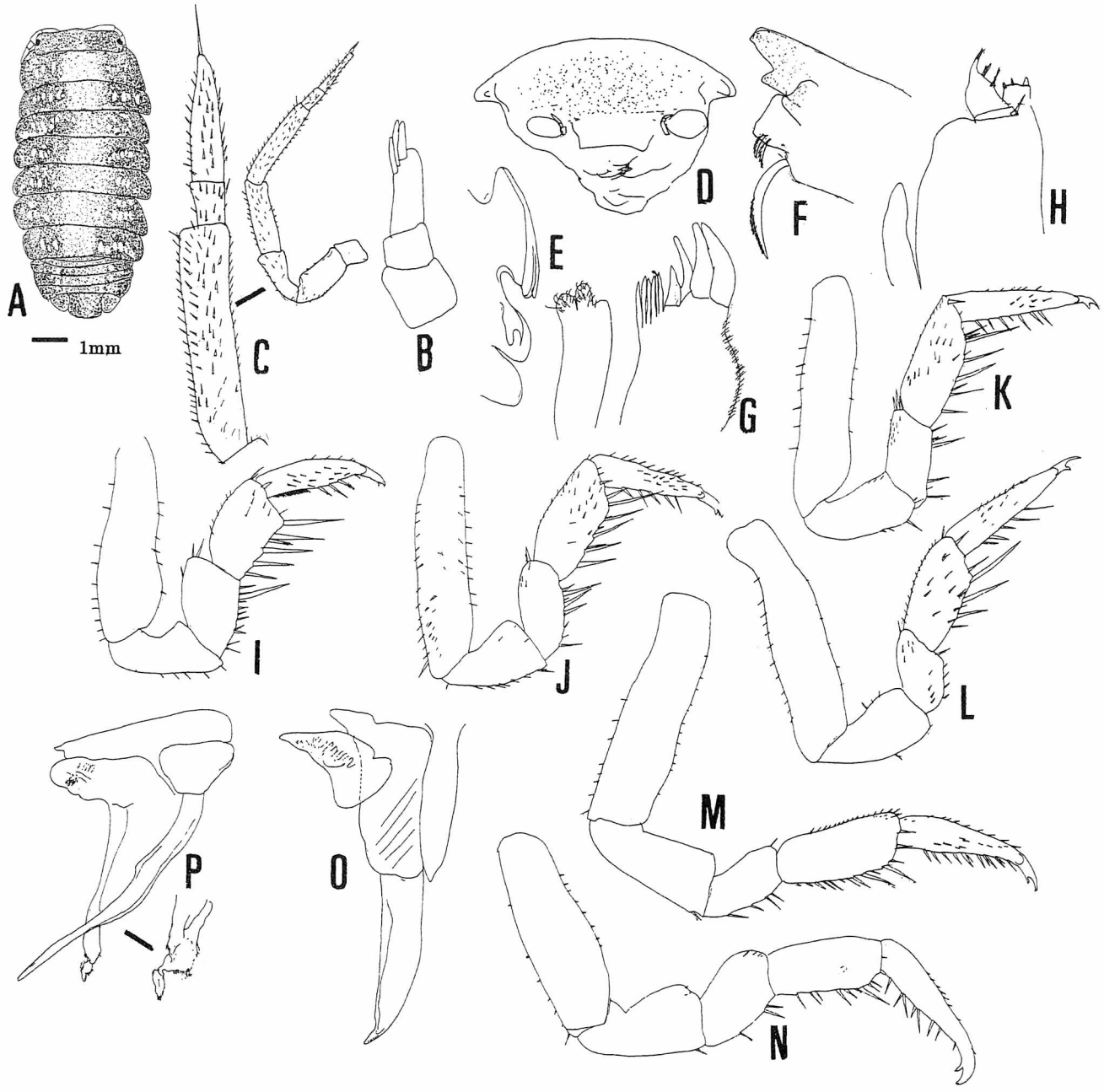

Fig. 8 *Venezillo dorsalis* (Iwamoto) from Miyakonojo

A: Dorsal view. B: Antennule. C: Antenna. D: Fronatal view of Cephalon. E: Ventral viewof pereonal somites 1-3. F: Right mandible. G: Maxillula. H: Maxilliped. I: Pereopod 1. J: Pereopod 2. K: Pereopod 3. L: Pereopod 4. M: Pereopod 6. N: Pereopods 7. O: Penes and pleopod 1. P: Pleopod 2 (All: Male speciemens from Miyakonojo)

shorter setae on inner margin and 2-3 setae at outer distal area; carpus 1.3 times longer than merus, with 4 longer and several shorter setae on inner margin, 2-3 setae on distal margin and 7-10 setae on outer margin; propodus 1.2 times longer than carpus, with 6-7 setae on inner margin and 8-9 setae on outer margin.

Pereopod 6 (Fig. 8M): basis 3.8 times as long as wide, 8-9 setae on inner margin and 13-15 setae on outer margin; ischum 3/5 as long as basis, with 2 setae near the inner distal angle; merus 55% as long as wide, with 4 setae on inner margin and a seta at outer distal angle; carpus 1.5 times longer than merus, with 12 setae on inner margin; propodus as long as carpus, with 12-14 setae on inner margin and 10-12 setae on outer margin.

Pereopod 7 (Fig. 8N): basis 3.0 tiems as long as wide, 7-10 setae on inner margin and 8-9 setae on outer margin; ischum 2/3 as long as basis, with 1-4 setae on inner margin; merus 5/8 as long as ischium, with 3-4 setae on inner margin; carpus 1.3 times longer than merus, with 9-10 setae on inner margin; propodus as long as carpus, with 8-10 setae on inner margin and 8-14 short setae on outer margin.

Penes (Fig. 8P) rather narrow and fusiform. Pleopod 1(Fig. 8P) endopod almost straight, apical part only slightly bent outward bearing a series of 7-8 denticles: exopod triangular, with rounded inner margin and a pointed outer angle. Pleopod 2 (Fig. 2O): endopod long; exopod long with a right-angled concavity on outer margin;

Female: Roughly similar to male except for copulatory apparatus.

Remarks: The present new species is most closely allied to *Venezillo dorsalis* (Iwamoto), but the former is separated from the latter in the following features: (1) less numerous denticles on the endopod of male pleopod, (2) less numerous denticles on the endopod of male pleopod 1, (3) less numerous ommtidia of eyes, but they are considered to be a variety within the same species.

Material examined: 1♂1♀, Miikie, Miyakonojo-shi, Miyazaki Pref., May 30, 200, coll. Noboru Nunormua, 1♂ Miyakonojo-shi, Miyazaki Pref., May 30, 2002, coll. Noboru Nunomura; 2♀♀ Kusano, Hyuga City, Miyazaki Pref., July 30, 2002, coll. Kunio Nishi.

Venezillo russoi (Arcangeli, 1927)

Armadillo russoi Arcangeli, 1927.

Sphaerillo russoi (Arcangeli, 1927), Nunomura, 1990, pp. 26-28. Fig. 149.

Venezillo russoi (Arcangeli, 1927), Nunomura, 1999, pp. 83-84, 89.

Material examined: 2♀♀, Kusano, Hyuga-shi, Miyazaki Pref. July 30, 2002, coll. Kunio Nishi.

Venzillo lepidus n.sp.

(Fig.9)

Description: Body 2.3 times as long as wide,. Color dull yellow with a pair of darker patterns, many of them are comb-shaped. Anterior line of cephalon slightly rounded (Fig. 9D). Eyes relatively small, each eye composed of 16-17 ommatidia. Dorsal surface smooth. Ventral sides of pereonal somite 1 with a pair of big schisma on lateral sides. Ventral side of pereonal somite 2 also long tooth. Pleotelson relatively long; length as long as width of the posterior end.

Antennule (Fig. 9B): first egment rectangular; second segment short; terminal segment slender with 4-5 aesthetascs on lateral-distal area. Antenna flagellum rather short, 45% as long as the fifth peduncular segment. Relative length of the 2 flagellar segments is 1:3.

Right Mandible (Fig. 9E): pars incisiva 3-toothed; lacinia moblis single-toothed; 2 hairy brisltes; processus molaris represented by a single tooth. Left mandible: pars incisiva toothed; lacinia moblis 3-toothed; 3 hairy brisltes; processus molaris represented by a single tooth Maxillula (Fig. 9F): inner lobe with 2 stout plumose setae; outer lobe with 10 simple teeth at the tip. Maxilliped (Fig. 9G): endite rectangular, with 5 spurs near the apical area; palp rather stout.

Pereopod 1 (Fig. 9I): basis oblong 4 times as long as wide, with 6-7 short setae on both margins; ischum about half the length of basis, with 7-8 short setae on inner margin and a seta at sternal margin; merus 4/5 as long as ischium, with 5-6 relatively long setae on inner margin and a seta on outer margin; carpus almost as long as merus, with 14-15 setae on inner margin and 7-8 short setae on outer margin; propodus 1.3 times as long as carpus, with 4

longer and more than 15 short setae on inner margin and 9-10 setae on outer margin.

Pereopod 2 (Fig. 9J): basis 4.6 times as long as wide, with 19-20 setae on inner margin and 8-10 setae on outer margin; ischum half the length of basis, with 13-14 setae on inner margin and 3 setae on outer distal area; merus 65% as long as ischium, with 5-6 setae on inner margin and 2 setae on outer distal angle; carpus 1.5 times as long as merus, with many setae on inner margin including a longer one and 8-10 setae on outer margin; propodus 85% as long as carpus, with 6 setae on inner margin and 8-10 setae on oueter margin.

Pereopod 3 (Fig. 9K): basis 4.3 times as long as wide, with 15-16 setae on inner margin, ischum half the length of basis, with 12-14 setae on inner margin and 4 setae on outer margin; merus 3/4 as long as ischium, with 10-11 setae on inner margin and 8-10 setae on outer margin; carpus 1.3 times longer than merus, with 9-11 setae on inner

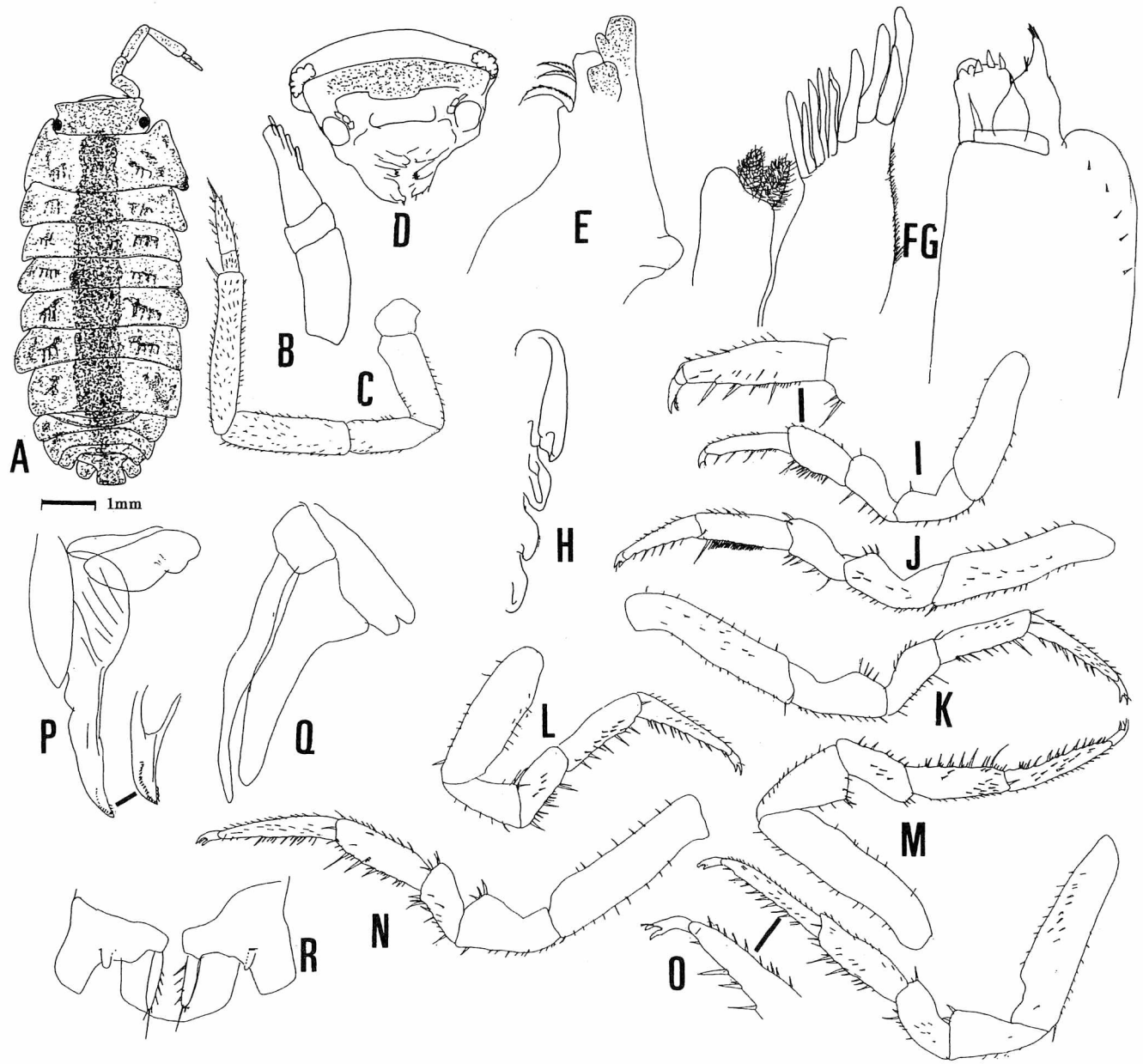

Fig. 9 *Venezillo lepidus* n.sp.

A: Dorsal view. B. Antennule. C: Antenna. D: Fronatal view of Cephalon. E: Right mandible. 3 F: Maxillula. G: Maxilliped. H: Ventral view of pereonal somites 1. I-O: Pereopod s 1-7. P: Penes and Pleopod 1. Q: Pleopod 2. R: Ventral view of uropod and pleotelson (All: Holotype male).

margin; propodus as long as carpus, with 8-9 setae on inner margin and 11-12 setae on outer margin.

Pereopod 4 (Fig. 9L): basis 3.1 times as long as wide, with 8-10 setae on inner margin and 6-10 setae on outer margin; ischium 55% as long as basis, with 5-6 setae on inner margin and 3-4 setae at outer distal angle; merus a little shorter than ischium, with 14-15 setae on inner margin; carpus 1.3 times longer than merus, with 7-10 setae on inner margin; propodus a little longer than carpus, with 11-12 setae on inner margin and 12-13 setae on outer margin.

Pereopod 5 (Fig. 9M): basis 4.1 times as long as wide, with 15-16 setae on inner margin and 7-8 setae on outer margin; ischium half the length of basis, with 12-13 setae on inner marign and 7-8 setae; merus 2/3 as long as ischium, with 7-8 setae on inner margin and 3 setae on sternal margin; carpus 1.4 times as long as merus, with about 20 setae on inner margin and 12-14 setae on outer margin; propodus 1.1 times longer than carpus, with 17-18 setae on inner margin and 17- 18 setae on outer margin.

Pereopod 6 (Fig. 9N) : basis 3.7 times as long as wide, with 10 setae on inner margin and 8 setae on outer margi; ischium 55% as long as basis, with 11-12 setae on inner margin and 3 setae on sternal margin; merus 57% as long as ischium, with 8-10 setae on inner margin and 4 setae on outer distal area; carpus 1.7 times as long as merus, with 16-18 setae on inner margin and 11-13 setae on outer margin; propodus 1.1 times as long as carpus, with 16-17 setae on inner margin and 14-15 setae on outer margin.

Pereopod 7 (Fig. 9O): basis 4.0 times as long as wide, with 9-10 setae on inner margin, a longer seta at inner distal angle, 10 setae on outer margin; ischum 45% as long as basis, with 3-4 setae on inner margin and 2 setae at outer distal angle; merus 4/5 as long as ischium, with 6-8 setae on inner margin and 2 setae at outer distal angle; carpus 1.2 times longer than merus, with 13-15 setae on inner margin and 11-12 setae on outer margin; propodus 1.1 times longer than carpus, with 12-13 setae on inner margin and 23-25 setae on outer margin.

Penes (Fig. 9P) fusiform, 4 times as log as wide, distal end rounded. Pleopod 1 (Fig. 9P): endopod straight, apical end bent outward, bearing about 15 spinules on inner margin; exopod short, 2.3 times as long as wide. Pleopod 2 (Fig. 9Q): endopod long and a little exceeds beyond exopod; exopod elongated triangular. Uropod (Fig. 9R): basis stout; endopod with 4-5 setae on inner margin; exopod small.

Female: Roughly similar to male except for copulatory apparatus.

Etymology: *lepidus* = charming in Latin.

Remarks: This species is most closely allied to *Venezillo russoi* (Arcangeli, 1927), but the former is separataed from the latter in the following fearures: (1) presence of comb-shaped darker patterns on dorsal surface, (2) rectangular exopod of male first pleopod (3) less numerous aesthetascs at the tip of antennule.

This species is also allied to *V. shuriensis*, reported from Okinawa Island, but the former is separataed from the latter in the following fearures: (1) presence of comb-shaped darker patterns on dorsal surface, (2) rectangular exopod of male first pleopod (3) longer exopod of male second pleopod, (4) less numerous aesthetascs at the tip of antennule, (5) numerous asetheacs aesthetascs at thetip of antennule.

Material examined: 5♂♂ (1♂ holotype, 7.2mm in body length and 4♂♂ paratypes, 4.3-4.8mm in body length) and 3♀♀ (1♀, allotype 7.7mm in body length and 2♀♀ paratypes, 7.0-7.3mm in body length), Cape Sata-misaki, 60m, laurel forest, Sata-cho, Kagoshima, May, 28, 2002. coll. Noboru Nunomura.

Type series is deposited as follows: Holotype (TOYA Cr-12986), allotype (TOYA Cr-12987) and 7 paratypes (TOYA Cr-12988-12994) at the Toyama Science Museum, 7 paratypes (OMNH Ar-5917-5923) at the Osaka Museum of Natural History, 7 paratypes (NSMT Cr-15168) at the National Science Museum, Tokyo.

Other specimens: 5♀♀, Nejime, Kagoshima Pref. May 28, 2002. coll. Noboru Nunomura; 1♂7♀♀, Aburatsu, Nichinan-shi, Miyazaki pref. May 26, 2002, coll. Noboru Nunomura; 2♂♂9♀♀. Nishikata, Sata-cho, Kagoshima Pr ef., May 28, 2002, coll. Noboru Nunomura.

Family Armadilldiidae

Armadillidium vulgare Latreille, 1804

Armadillidum vulgare Latreille, 1804; pp. 48.

Armadillidum vulgare Latreille, 1804; Nunomura, 1990, pp. 3-5, fig. 137.

Material examined: 1♂, Asahi-machi, Mizobe-cho, Kagoshima Pref., May 29, 2002, coll. Noboru Nunomura; 1♂, foot of Mt. Uomi-dake, Ibusuki-shi, Kagoshima Pref., May 29, 2002, coll. Noboru Nunomura; 2♂♂, Hinokami park, Makurazaki-shi, Kagoshima Pref., May 29, 2002, co l l Noboru Nunomura; 1♂, Kusayanagi, Bounotu, Kagoshima, Pref., May 29, 2002, coll. Noboru Nunomrua; 1♂2♀♀, Natsui, Shibushi-cho, Kagoshima Pref., May 27, coll. Noboru Nunomura; 1♀, Banshobana, Ei-cho, Kagoshima Pref., May 29, coll. Noboru Nunomura; 4♀♀, Takamatsu, Kushima-shi, Miyazaki Pref., May 28, 2002, Coll. Noboru Nunomura; 2♀♀, Sakurajima-cho, Kagoshima Pref., Apr. 4, 1994, coll. Noboru Nunomura.

Family Tylidae

Tylos granuriferus Budde-Lund, 1885

Tylos granulatus Miers (Not Krauss), 1877, p. 674, pl. 69, fig. 2.

Tylos granuriferus Budde-Lund, 1885; Nunomura, 1990, pp. 39-41, fig. 156.

Material examined: 1♂1♀, Toshima Miyazaki.

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